

## SABER H<sub>2</sub>O new v2.07 data product now available

SABER H<sub>2</sub>O data have not been made publicly available up to now due to radiance errors of unknown origin and magnitude that recently were identified and corrected. The cause of the errors was determined to be unaccounted for spectral out-of-band radiance in the H<sub>2</sub>O channel centered at 6.8 $\mu$ m arising from ozone emission in the 9.6 $\mu$ m band. The corrected SABER radiances have been used to produce a long-term H<sub>2</sub>O data base labeled as version 2.07. Water vapor volume mixing ratio (VMR) vertical profiles are now available in the SABER data archive covering the stratosphere and mesosphere extending from near the tropopause at  $\sim 100$ hPa ( $\sim 16$ km) up to the mesopause region at  $\sim 0.006$ hPa ( $\sim 83$ km) and over the time period from January 25, 2002 to the present day. The random error of the v2.07 product is  $\leq 3\%$  at 60km and below, 10% at 70km and 30% at 80km. The rapid increase above 70km is mainly due to low signal-to-noise. The estimated systematic error of SABER version 2.07 H<sub>2</sub>O is about 10-20%. Coincidence analysis between SABER v2.07, MLS v4.2, ACE v3.5-3.6, MIPAS ESA reprocessed v6, and SOFIE v1.3 shows overall excellent agreement in the mean profile with the mean difference being within  $\pm 10\%$  in most cases. In the stratopause region SABER H<sub>2</sub>O tends to be biased high relative to the correlative datasets especially in the SH polar winter where the mean difference reaches 20% or greater. In polar summer above 80km, SABER H<sub>2</sub>O is biased low by  $\sim 20\%$  compared to the other measurements.

SABER H <sub>2</sub> O Error Estimates								
Altitude (km)	Trop	20	30	40	50	60	70	80
Systematic Error (%)	21	16	13	10	11	13	14	20
Random Error (%)	3	3	2	2	2	3	10	30
Total Error RSS of systematic and random (%)	21	16	13	11	11	14	18	36

Validation paper is in review: Rong et al. (2019), Validation of water vapor measured by SABER on the TIMED satellite